FIND OCEAN QUAHOGS ABUNDANT OFF MASSACHUSETTS

Large quantities of ocean quahogs were found in the near-shore waters off Ipswich and Gloucester, Massachusetts, during experimental fishing from the 57-foot Gloucester trawler 'Jo-Ann', April 18-May 6. Catch rates up to 30 bushels per hour of the large, 3- to 4-inch-long, edible molluscs were achieved in 10 to 15 fathoms just north of Cape Ann, Mass.

Fig. 1 - Catch of Ocean Quahogs on deck of Gloucester trawler Jo-Ann.

Funds to charter Jo-Ann were supplied by Economic Development Administration (EDA); fishing equipment and technical direction were provided by NMFS. The captain and 3-man crew fished.

Principal objectives were: (1) to investigate potential of underutilized clam resources in Gloucester area; (2) to test adaptability of a small New England dragger for conversion to hydraulic jet dredging. Both objectives were reached.

Results Encouraging

The results were encouraging enough to suggest that more, formally planned surveys might accelerate establishment of a small-boat jet-dredge clam fishery in Gloucester area. The converted and equipped Jo-Ann proved an effective and efficient clam dredge vessel.

Gear

A hydraulic jet dredge with a 32-inch fixed blade was fished. The dredge was used with a diesel-powered centrifugal pump that supplied water under pressure (70 p.s.i. on deck) through a 5-inch hose to the dredge manifold and jets. A double-drum trawl winch was driven by a power take-off from the main engine. One winch drum contained $\frac{1}{2}$-inch wire rope used for setting and hauling the dredge. The other winch drum contained 1-inch nylon rope for towing the dredge.

Fishing Procedure

(1) The dredge hose was let out over the stern. (2) The dredge was lifted over the side and lowered to ocean bottom by $\frac{1}{2}$-inch wire rope from one winch drum. This wire passed through a block on the end of a heavy boom. At the same time, the nylon towing rope was spooled off of the other winch drum in amount needed. The tow rope passed through a hanging block at the center of the deck and over the stern. (3) The centrifugal pump was

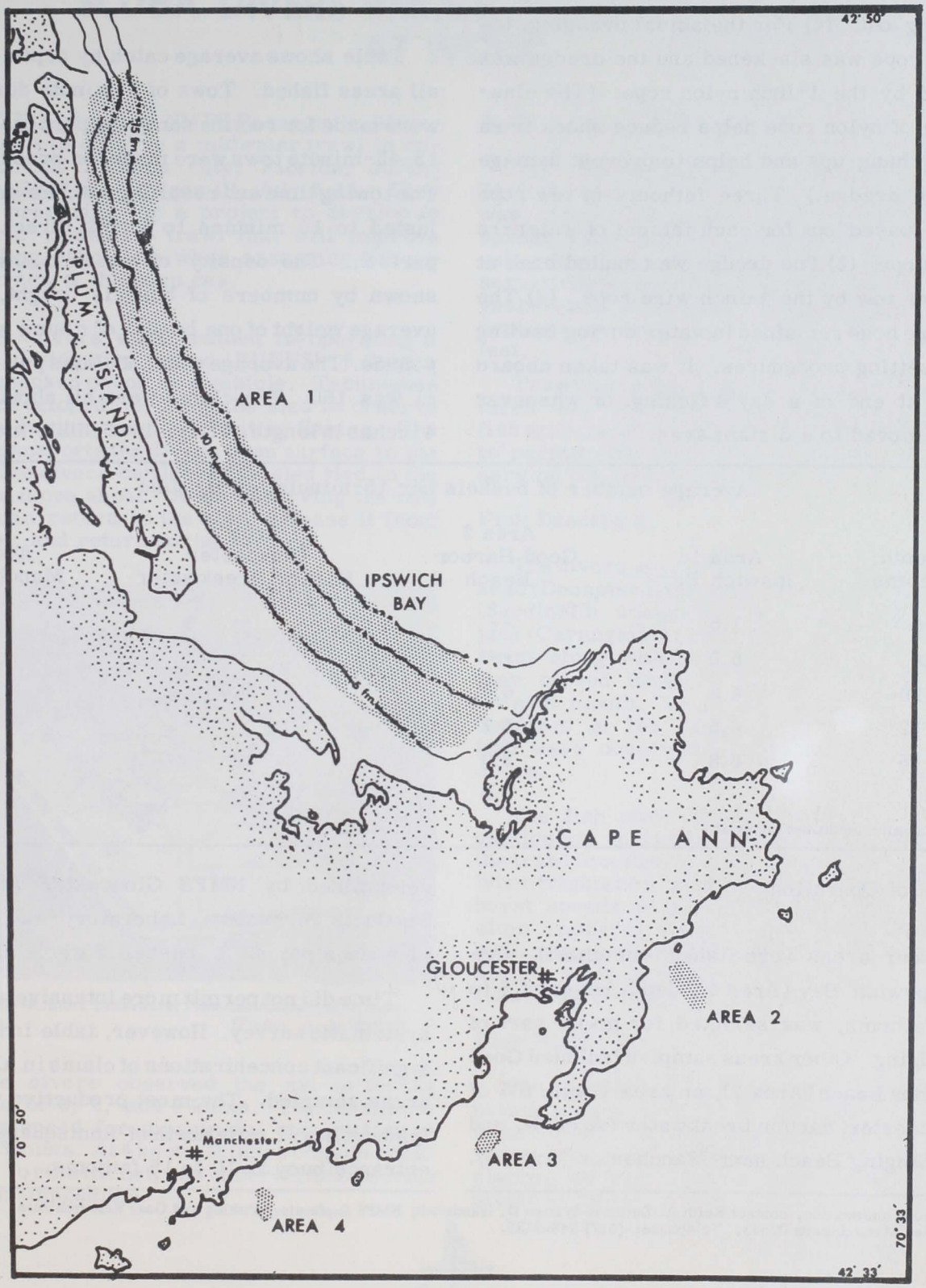


Fig. 2 - Ocean quahog area surveyed April 18-May 6, 1971.

started to supply water to the dredge while setting out. (4) For the actual dredging, the wire rope was slackened and the dredge was towed by the 1-inch nylon rope. (The elasticity of nylon rope helps reduce shock from minor hang-ups and helps to prevent damage to the dredge.) Three fathoms of tow rope were payed out for each fathom of water--a 3:1 scope. (5) The dredge was hauled back at end of tow by the $\frac{1}{2}$-inch wire rope. (6) The dredge hose remained in water during hauling and setting procedures. It was taken aboard only at end of a day's fishing, or whenever boat moved to a distant area.

Results

Table shows average catch by depth(s) for all areas fished. Tows of 5-minute duration were made for routine sampling purposes, and 15-45-minute tows were made for production. The towing time and resulting catches are adjusted to 15 minutes to permit direct comparison. The density of ocean quahogs is shown by numbers of bushels caught. The average weight of one bushel of clams was 75 pounds. The average count of clams per bushel was 160. The clams were all about $3\frac{1}{2}$ to 4 inches in length. The yield of edible meats--

Average number of bushels per 15-minute towing time				
Depth Fathoms	Area 1 Ipswich Bay	Area 2 Good Harbor Beach	Area 3 Gloucester Harbor Breakwater	Area 4 Manchester
5-6	1.5	--	--	--
7-8	5.9	--	--	--
9-10	4.3	6.0	9.0	--
11-12	6.5	6.7	--	--
13-15	8.8	3.0	--	2.2
20	--	3.0	--	--

-- indicates depths not surveyed.

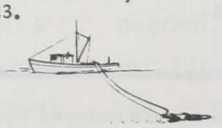
Area of Operation

Four areas were fished (see chart). One in Ipswich Bay (Area 1), depth range of 5 to 15 fathoms, was selected for major part of dredging. Other areas sampled included Good Harbor Beach (Area 2), an area 1 mile SW of Gloucester harbor breakwater (Area 3), and off Singing Beach near Manchester (Area 4).

determined by NMFS Gloucester Fishery Products Technology Laboratory-was about 11 pounds per 80 lb. bushel of whole clams.

Time did not permit more intensive and/or systematic survey. However, table indicates significant concentrations of clams in all four areas sampled. The most productive was in Ipswich Bay, 1 mile north of Annisquam River entrance buoy in 10 to 15 fathoms.

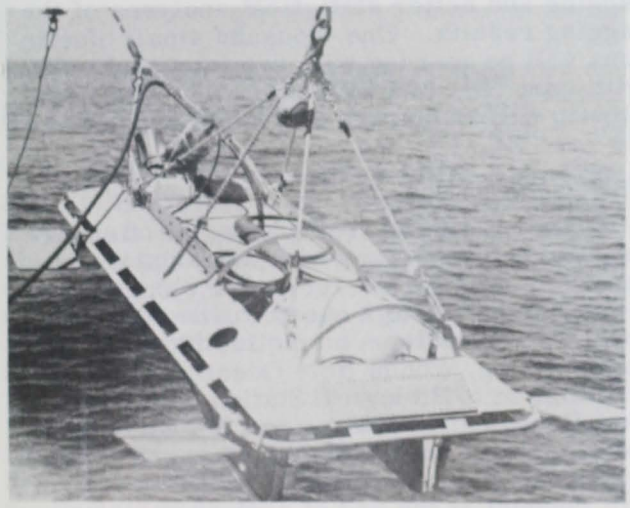
For more information, contact Keith A. Smith or Warren D. Handwork, NMFS Exploratory Fishing and Gear Research Base, Woods Hole, Massachusetts 02543. Telephone: (617) 548-5123.



SCUBA DIVERS WATCH MIDWATER TRAWL AT WORK

SCUBA divers of NMFS Pascagoula, Miss., were able to observe a midwater trawl in operation off Panama City, Florida, during Cruise 28 of the 'Oregon II', July 6-11. They were preparing for a project to develop an electric midwater trawl that will improve sampling efficiency when assessing fishery resources of the open sea.

The divers were trained in operating a towed diving sled named 'RUFUS'; 5 divers have checked out on this vehicle. Techniques were developed for using the sled to observe the midwater trawl while it is fishing. The sled transports the divers from surface to the net. The divers can leave the sled tied to the net and move about. After observing the net, they can return to the sled, release it from the net, and return to the surface.



RUFUS--Remote Underwater Fisheries Assessment System. (Photo: A. J. Barrett)

The divers observed the net at towing speeds of 2, 3, and 4 knots. The maximum towing speed for meaningful observation is about 3 knots. At 4 knots, it takes considerable effort to ride the net, and observations become almost impossible.

Net's Fishing Configuration

The fishing configuration of the standard 30-foot midwater trawl was evaluated. It was almost perfectly square: each side spread 20 to 25 feet when towed at 3 knots using the standard 40-fathom bridles. Observations when using 10-fathom bridles revealed satisfactory horizontal spread, but the vertical opening was reduced to 10 to 15 feet.

Trawling along a line of artificial structures was an effective method to position fish schools in path of mid-water trawl--and to permit efficient use of diver time for observing the interaction of fish and gear.

Fish Reactions

The divers watched the reactions of round scad (Decapterus punctatus), Spanish sardine (Sardinella anchovia), and numerous small jack (Carangidae) to the trawl. Schools would swim along with and inside the net. Often, they moved back 20 to 30 feet inside the trawl's mouth. There was no herding effect apparent at the doors of bridles, although fish were observed to school along with the doors.

The fish often appeared to be feeding on particulate material while swimming inside the trawl mouth at towing speeds over 3 knots. When frightened, they were easily capable of burst speeds to escape the net. The divers often reported over 1,000 pounds of fish swimming in and around the net--but catches always were less than 100 pounds when the trawl was brought aboard.

Fish Within Range

The presence of fish in and around the trawl mouth places them well within range of the electric field for the proposed electric midwater trawl. No difficulty is expected from placing the electrode hardware around the mouth of the net.

1971 STOCKING PROGRAMS IMPROVE GREAT LAKES FISHERIES

U.S. and Canadian waters of the Great Lakes this year will receive 15-16 million hatchery-reared fish. The stocking of over 8.5 million coho and chinook salmon is a record for these species. The State of Michigan introduced the coho in 1966 and the chinook in 1967. Ontario has been releasing another salmonid, the kokanee, since 1965; this year 1.1 million were stocked in Lake Ontario.

Lake trout plantings for 1971 are slightly over 4 million yearlings. These are about equally divided between lakes Superior and Michigan. There, stocking programs to restore this fishery nearly destroyed by the sea lamprey have been underway--since 1958 in Superior and since 1965 in Michigan. Rehabilitation is being conducted along with lampricide treatment of the streams where the predator sea lamprey spawns.

Besides planting 13.8 million young salmon and lake trout, the release schedules of state and provincial fishery agencies include over 2 million young fish of other trout species and walleyes.

For the salmonids and lake trout, the total annual plantings in the Great Lakes through 1971 are: lake trout 43.5 million; coho 20.5 million; chinook 9.3 million; and kokanee 15.4 million (including 2 million eggs in 1965-66).

Lake Michigan

Lake Michigan will receive about half the fish released in the Great Lakes this year--slightly under 7 million coho, chinook, and lake trout, and about 900,000 other trout: brown, brook, and rainbow or steelhead. About 4.1 million of the State of Michigan's 6.5 million salmon were planted in this lake in 1971. Originally, Michigan planned a spring release of about 4.5 million coho and 3 million chinook in the state's Great Lakes waters. But the winter toll of young fish reared in outdoor ponds reduced by a half-million the stocking of each species.

Michigan also supplies a large share of the coho eggs going into the hatcheries in other lake states and Ontario; the remainder come from the west coast and Alaska.

ICCAT TUNA-TAGGING EXPERIMENT BEGINS OFF NORTHEAST U.S.

If you find a tag on a tuna or billfish, you will be eligible for a $300 jackpot to be offered by the International Commission on the Conservation of Atlantic Tunas (ICCAT). The chances will be excellent with any bluefin tuna catch because 1,000 are being double-tagged this summer in a new ICCAT-proposed international experiment.

Conducting the study are Woods Hole Oceanographic Institution, Woods Hole, Mass.; NMFS Tropical Atlantic Biological Laboratory, Miami, Florida; and the St. Andrews Biological Station of Canada's Fisheries Research Board. The coordinator is Frank J. Mather of Woods Hole.

The experiment is being conducted off the U.S. northeastern seaboard. It is designed to compare the effectiveness of two widely used types of tags. The planners say the results should permit more efficient and uniform tagging and better statistical analyses of the tagging results. One thousand small bluefin tuna will be marked with two tags each--500 with type "D", 500 with type "H". Additional bluefin will be marked with single tags, either "D" or "H".

Data Sought

Fishermen who recapture the fish are urged to return all tags with these data: date, location, method of recapture, length, and weight of fish. Tags can be turned over to a local fishery officer, or mailed either to address on tag, Woods Hole Oceanographic Institution, or to Biological Station, St. Andrews, New Brunswick. These agencies will pay $5 for each tag. The number of each will be entered in the drawing for the $300 prize ICCAT will conduct at the end of each year.

Program Objectives

The experiment will help define the bluefin tuna's migratory patterns and populations; also, it will help to estimate the effects of large-scale commercial fishing on the northwestern Atlantic stock. Previous results indicated this stock is small and heavily exploited. Before the new experiment, ICCAT had recommended that commercial fishing of bluefin tuna under 23 pounds be discouraged.

Tag returns have revealed mass migrations of small bluefin tunas across the Atlantic in both directions. Catch statistics indicate that these migrations, which appear to occur irregularly rather than annually, have affected commercial fisheries decisively. Cooperating sport fishermen have provided valuable data.

Principal support for the tagging project comes from NOAA's National Sea Grant Program. Matching funds have been donated by the Sport Fishing Institute, fishing clubs, and sport fishermen.

ICCAT

The International Commission for the Conservation of Atlantic Tunas (ICCAT) became effective in 1969 after ratification by seven nations: U.S., Canada, Japan, South Africa, France, Ghana, and Spain. It is headquartered in Madrid. The convention was drafted in Rio de Janeiro in 1966 by delegates from 17 nations. It was the first such international conference in which sport-fishing interests were represented.

NMFS JOINS NEW YORK IN LOBSTER STUDY

In early June, biologists of the New York State Conservation Department and the NMFS Biological Laboratory, Boothbay Harbor, Maine, cooperated in ecological and tagging studies. They were investigating the mixing of offshore with inshore lobster populations along the south shore and eastern tip of Long Island.

About 500 lobsters were caught, tagged, and released in eastern portion of Long Island Sound, off Montauk Point, and Long Island's southeastern shore.

What Tag Returns Will Show

The amount and distribution of tag returns in the coming year will distinguish inshore from offshore lobsters. Also, these returns will document further seasonal movements, exploitation rates, growth, and degree of stock mixing.

WHY MANY FISH DIE DURING RED TIDE INVASION

Researchers of the University of Southern California's Allan Hancock Foundation and Sea Grant Programs report they have the scientific answer to why many fish die during the Red Tide invasion of southern California's coastline.

It was believed previously that consumption of oxygen during the decomposition of dead one-cell microorganisms of the Red Tide in California waters killed fish. Now the USC researchers have determined that the fish kill results directly from a toxin within the one-cell microorganisms of the Red Tide, according to Dr. Bernard C. Abbott, Hancock Director.

The toxin in Red Tide cells, taken in samples from the Hermosa Beach pier area, was isolated by an extractive method. It "affected immediate kill in a laboratory fish population," Dr. Abbott reported.

Working with Dr. Abbott were Mikihiko Oguri of Whittier, research associate, and visiting professors Michael Spiegelstein and Z. Paster of Israel's Tel Aviv University.

The Toxin

The toxin isolated by the researchers is retained within the Red Tide's one-cell organisms (Gonyaulax polyhedra) until the cell dies. "Because the current Red Tide population off our coast is a living population, the toxin is retained in the cells and will produce fish kills only when a large number of the cells die," Dr. Abbott said. He has studied the California and Florida Red Tide populations. "These are unrelated species. The Florida organisms release their toxin into the environment while in their living state. This produces large fish kills and can cause both throat and mouth irritations in man."

SLOPING BEACH IS BEST PROTECTION AGAINST EROSION

Natural and manmade erosion is a very serious problem along Florida's shores, reports the State's Bureau of Beaches and Shores. Measurable damage from beach erosion over the years has reached millions of dollars. No price tag can be put on probably the greatest damage--the loss of valuable recreational areas. Over 200 miles of once-beautiful beaches have been eroded so much that they must be restored artificially.

The problem has become so serious that it is necessary in many areas to line the shores with massive rock piles to protect upland development. In some areas, many other protective devices have been installed to rebuild eroded beaches.

To increase the protection of upland development, hundreds of miles of seawalls have been constructed along the shorelines. These seawalls may have some value, but they contribute to beach erosion. Where seawalls are necessary, they should be located well landward of the beach foreshore, says the Bureau.

The best protection for upland development is a wide, gently sloping beach. The sea's energy is spent without eroding the beach.

What To Do?

How can beaches be protected? The Bureau of Beaches and Shores proposes:

"First, we must recognize the fact that our beaches are vital to the economic well-being of the State, as well as being important to the citizens of the state for recreation and enjoyment. Therefore, it is necessary to exercise a certain amount of control for the protection of the beaches.

"Structures must be kept far enough away from the water to prevent damage to the beach.

"Efforts must be made to bypass sand around inlets and rivers which interrupt the littoral drift.

"When a beach has been severely eroded we must go offshore, outside of the beach system, and pump sand back onto the beach. This appears to be the best solution to the problem in the long run. However, such a program is expensive and requires the support of all levels of government."

VIMS OCEANOGRAPHERS STUDY NUCLEAR POWER PLANT DISCHARGES

Physical oceanographers of the Virginia Institute of Marine Science are working on one of the first detailed before-and-after analyses of waste-heat discharge into an estuary by a nuclear electric-generating facility. Their research, under a 3-year contract with Atomic Energy Commission, also will yield information on the accuracy of present scientific methods of predicting these effects.

Scientists and technicians are constantly recording James River data near Hog Island, where the large VEPCO Surry County Nuclear Generating Facility is nearing completion. All data are recorded automatically on tape, translated by computer, and will be published periodically. Dr. W.J. Hargis Jr., VIMS director, said: "We are collecting pre-operational background data now. Then we will continue the survey at Surry Point after one nuclear generator unit and, at a later date, after two nuclear generator units are made operational."

Surveying & Monitoring

Dr. C.S. Fang, head of Department of Physical Oceanography and Hydraulics and principal project investigator, added: "We are taking data three ways. We are surveying and monitoring aboard the VIMS research vessel 'Investigator' twice weekly. Very sensitive thermal equipment and tide gauges continuously record data from seven VEPCO concrete towers located in the river at key points near the facility. Also, through the cooperation of NASA-Wallops, we routinely fly over the area for infra-red aerial photographs."

Dr. Hargis noted that this environmental study of waste-heat discharge into an estuary will involve, when the Surry plant is ready, one of the greatest amounts of waste heat effluent ever studied in such detail.